



Defensie

The Dutch perspective on C2 - Sim coupling

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Contents

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Introduction

C2 – Simulation Integration

Command & Control (C2) systems should be integrated with simulators for:

1. Training systems
2. Mission rehearsal
3. Decision support

Introduction

Objective and reason for study

Objective

- Find a reusable solution for coupling C2-Sim systems for the long term

Reason

- Urgency in project TACTIS.

Principles/conditions

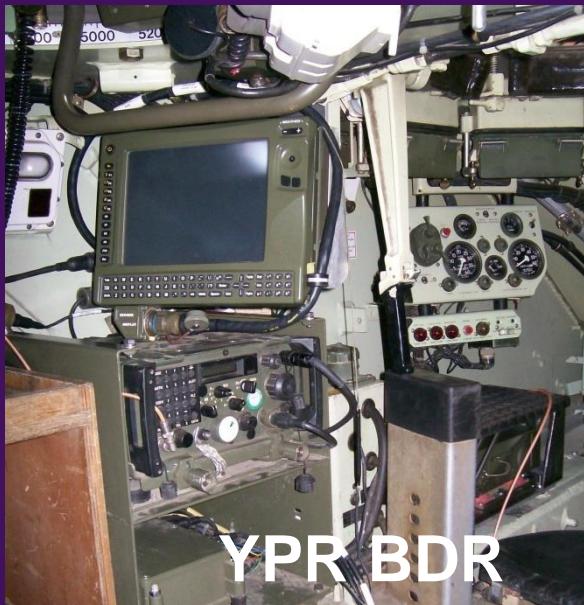
- Use operational C2 equipment and applications
- The C2 systems should not need adjustment for C2 - sim coupling

Introduction Operational systems

15-02-2010



Operational
environment



Introduction

What is TACTIS ?

Objective

- Find a reusable solution for coupling C2-Sim systems for the long term

Reason



C2 Simulation integration

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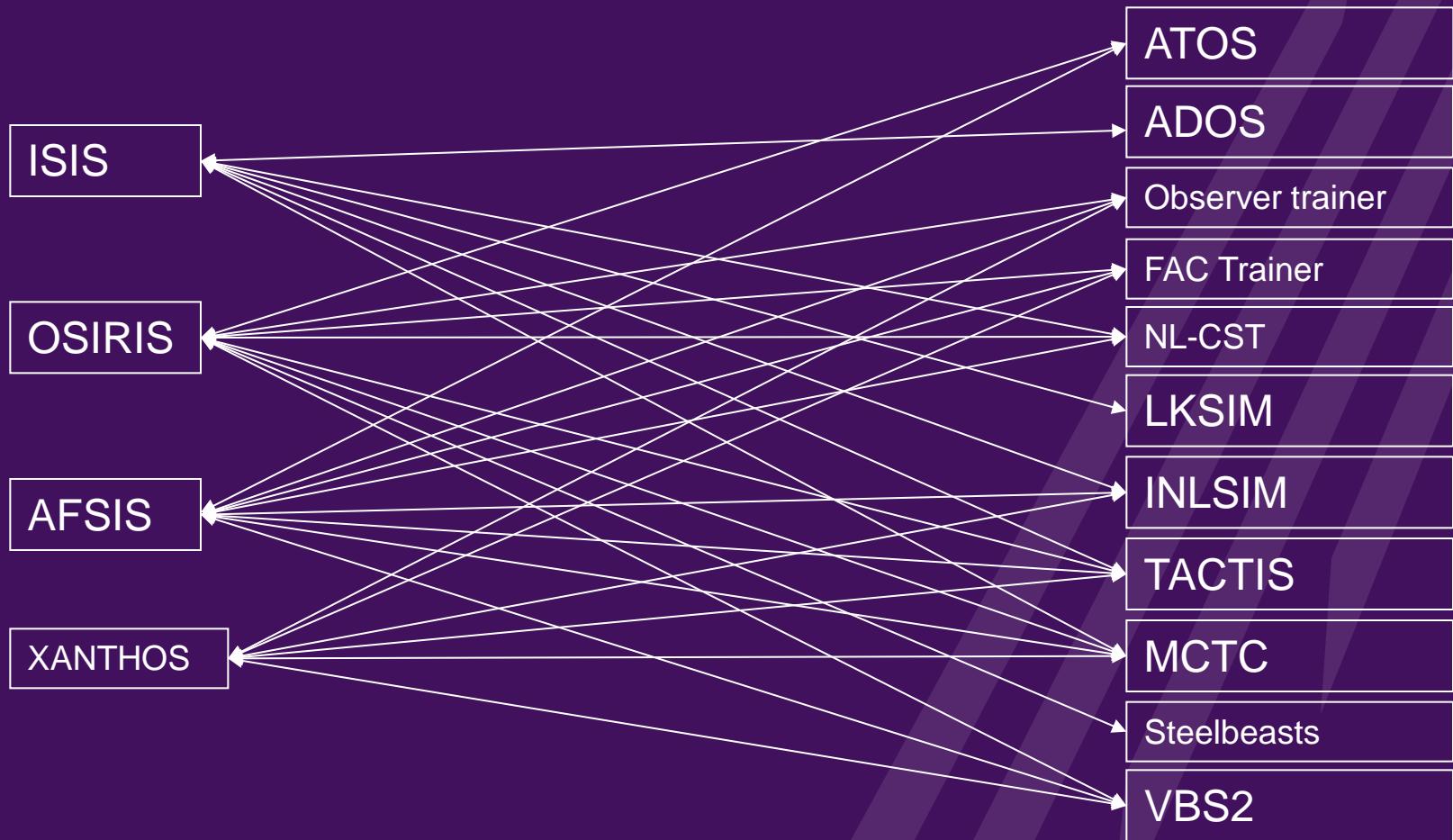
1. The TACTIS project required Command & Control (C2) integration with simulation for unit level training using Virtual and Constructive simulators.
2. A reusable solution leads to the requirement that integration of other simulators, like the Command Staff Trainer (Constructive Simulation), must also be supported.

Scope

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Command & Control (C2)

Training Simulators



The NL C2 domain (1)



Applications

Presentation
support

Data
service

Synchronization

Persistency
service

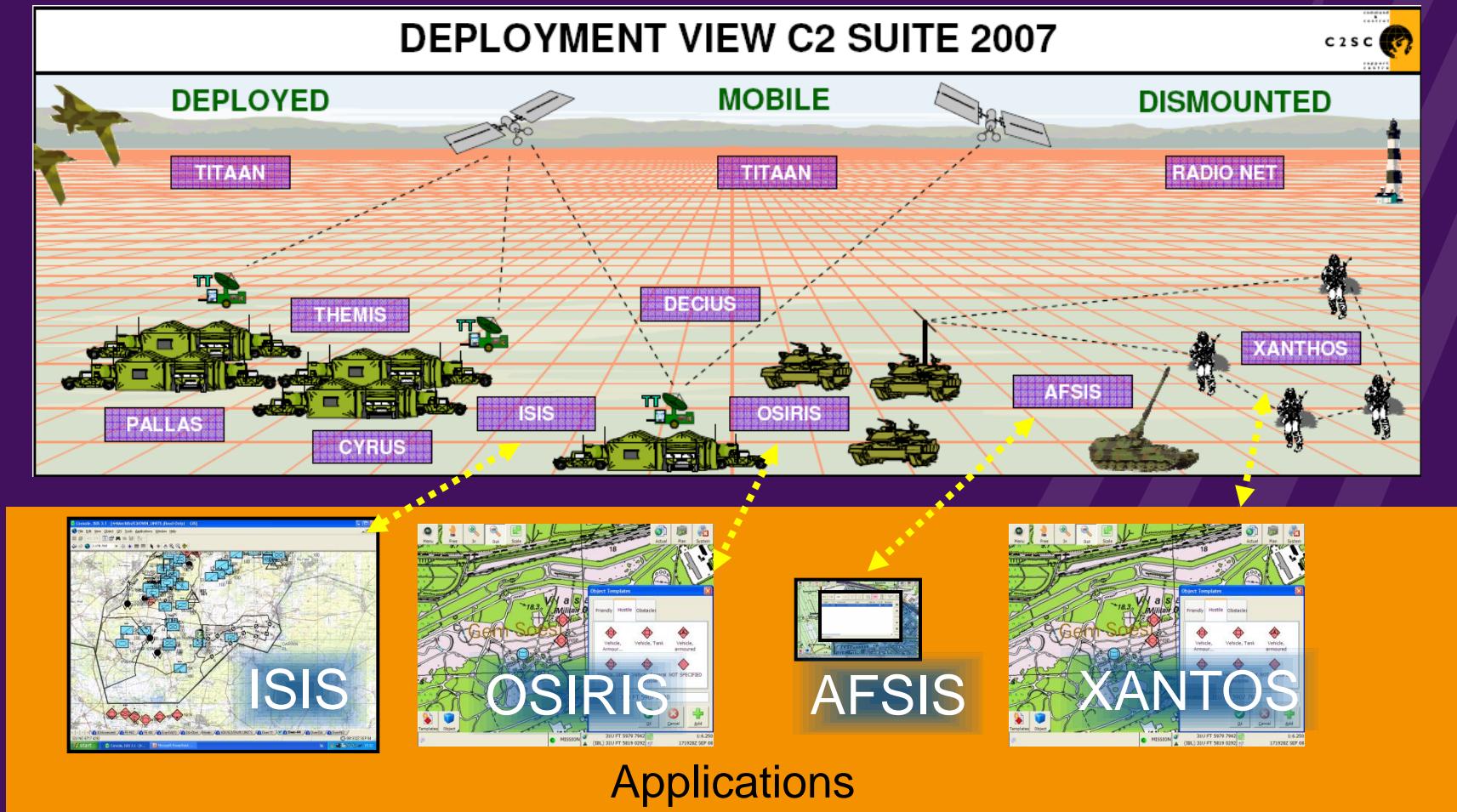
MIP
gateway

Distribution
service

TITAAN
(networking)

CNR
networking

The NL C2 domain (2)

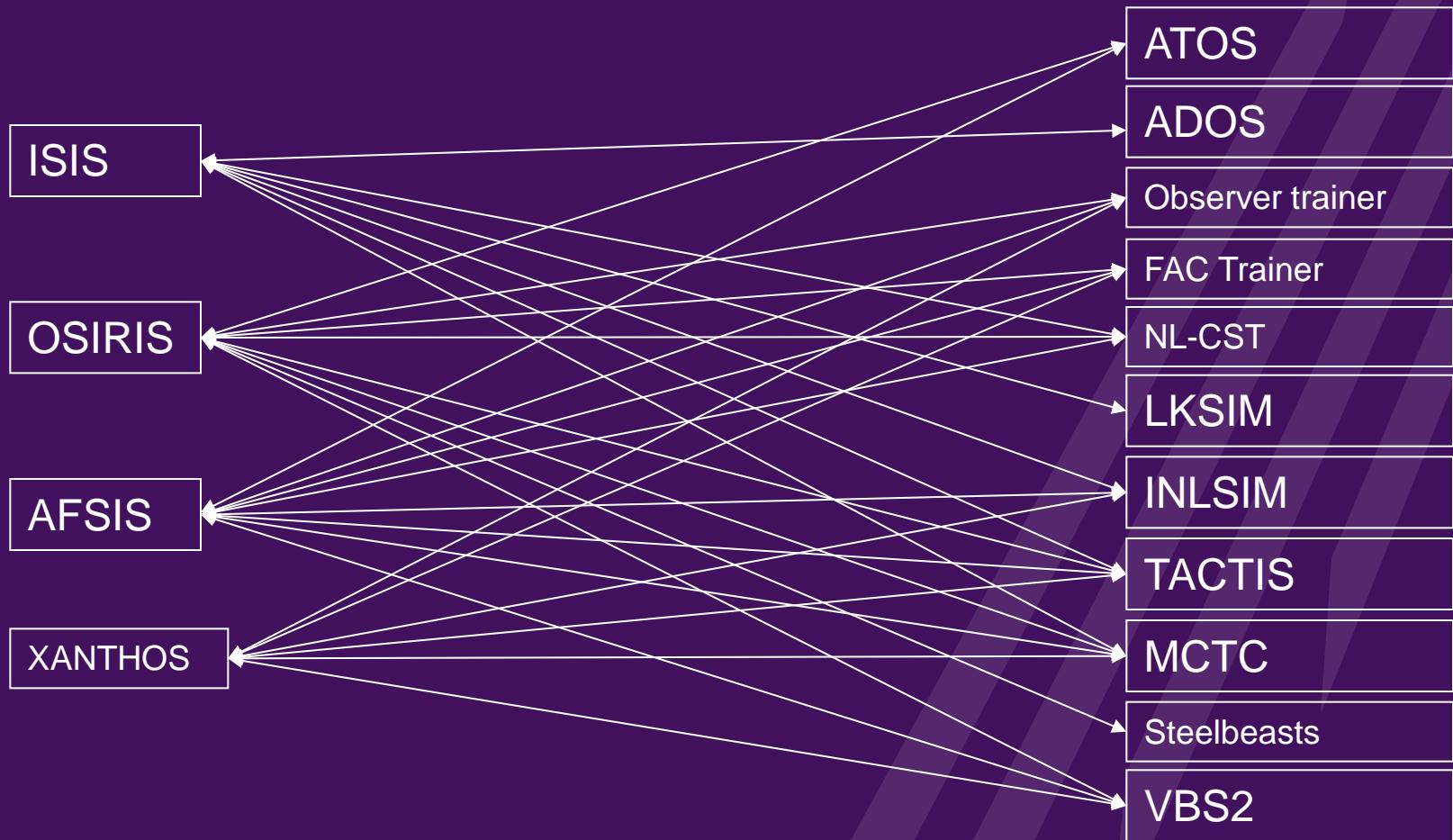


Scope

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Command & Control (C2)

Training Simulators



NL simulation training domain

Training Simulators

Artillery procedure chain trainer
Air Defense procedure trainer
Observer trainer
Forward Air Controller simulator
Command and Staff trainer
Logistics supply chain simulator
Intelligence simulator
Tactical Indoor simulation
Mobile Combat Training Centre
Game Steelbeasts
Game VBS2

ATOS

ADOS

Observer trainer

FAC Trainer

NL-CST

LKSIM

INLSIM

TACTIS

MCTC

Steelbeasts

VBS2

Scope

Command & Control (C2)

MIP – DEM
JC3IEDM

ISIS

OSIRIS

AFSIS

XANTHOS

Training Simulators

HLA, DIS

ATOS

ADOS

Observer trainer

FAC Trainer

NL-CST

LKSIM

INLSIM

TACTIS

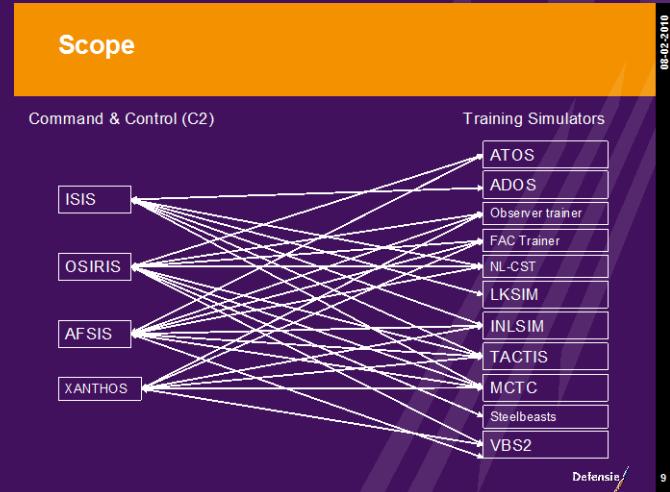
MCTC

Steelbeasts

VBS2

Used input for the C2 - Sim information exchange analysis

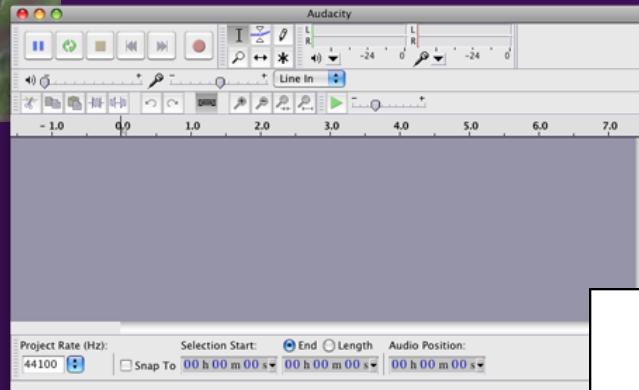
- User requirements for training systems
- Standards under development:
MSDL, C-BML
- Experience with existing
C2 –Sim links



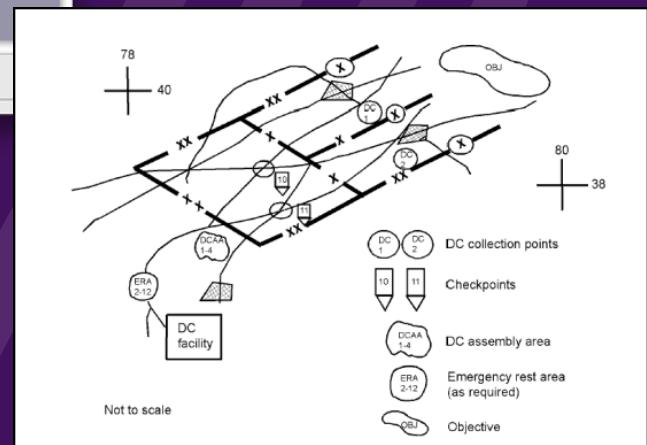
User Requirements for the TACTIS situation



1. Common Operational Picture



2. Simulation and C2 system control



3. Plans and orders

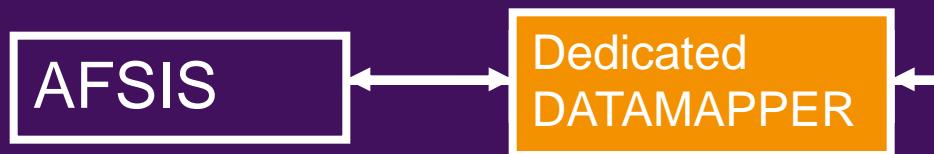
Standards under development

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Take into account (long-term)

- MSDL (for initialization of simulations)
- C-BML (plans and orders)

Experience with existing C2 – Sim coupling



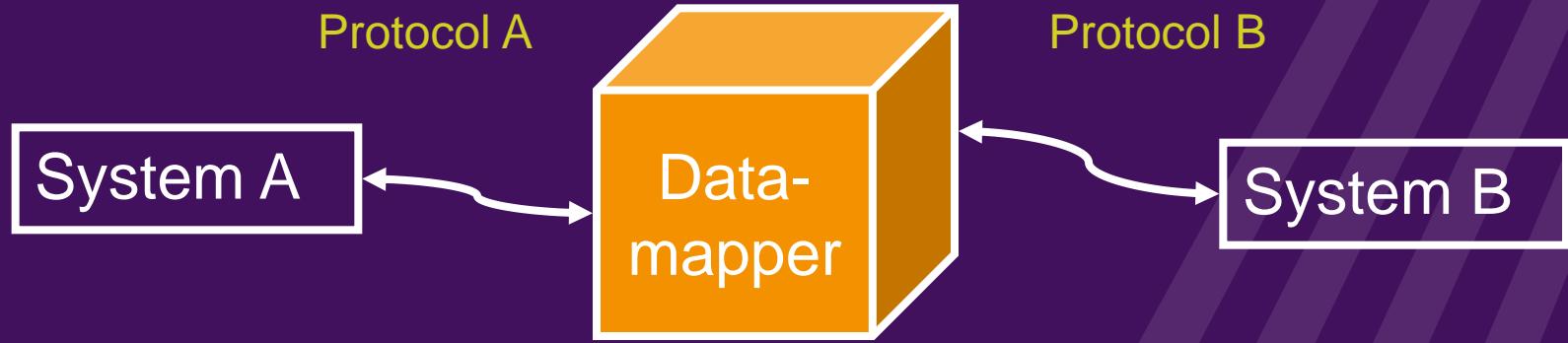
Result in AFSIS: COP, Fire support reports



Result in MCTC is AAR data for instructors

- COP (Perceived truth as seen by players)
- Ground truth (from MCTC)

What is a Datamapper



WISE, a typical COTS Datamapper

Claimed capabilities

- **Standard protocols** HLA 1516(Pitch, MÄK, NG), HLA 1.3(GERTICO, MÄK), DIS, MIP (Multilateral Interoperability program C2IEDM), Link 16, Google Earth/Maps, Web Services
- **Proprietary protocols** WISE SecureSocket, SAFIR DOB, (Saab C2-C4), PDU 2.0 (Saab TES), WCU (Saab Civilian C2), OneSAF, BattleTek, Saab Gizmo Distribution, SQL Server, LinkZA, RBS 70 (SBD), Enemy Territory, Microsoft Combat FS
- **Future** Link 11, Link 22, C-BML, TENA, PDU 3.0, DDS, MIP(JC3IEDM), HLA Evolved, MATREX RTI, RTI NG Pro, CoT

Benefits

- Automatic connections
- User defined connections
- Analyzing and testing
- No modifications are needed

Disadvantages

- Stuck to one manufacturer
- No NLD experience with all capabilities
- Some problems can't be solved by datamapping

Conclusions wrt COTS datamapper

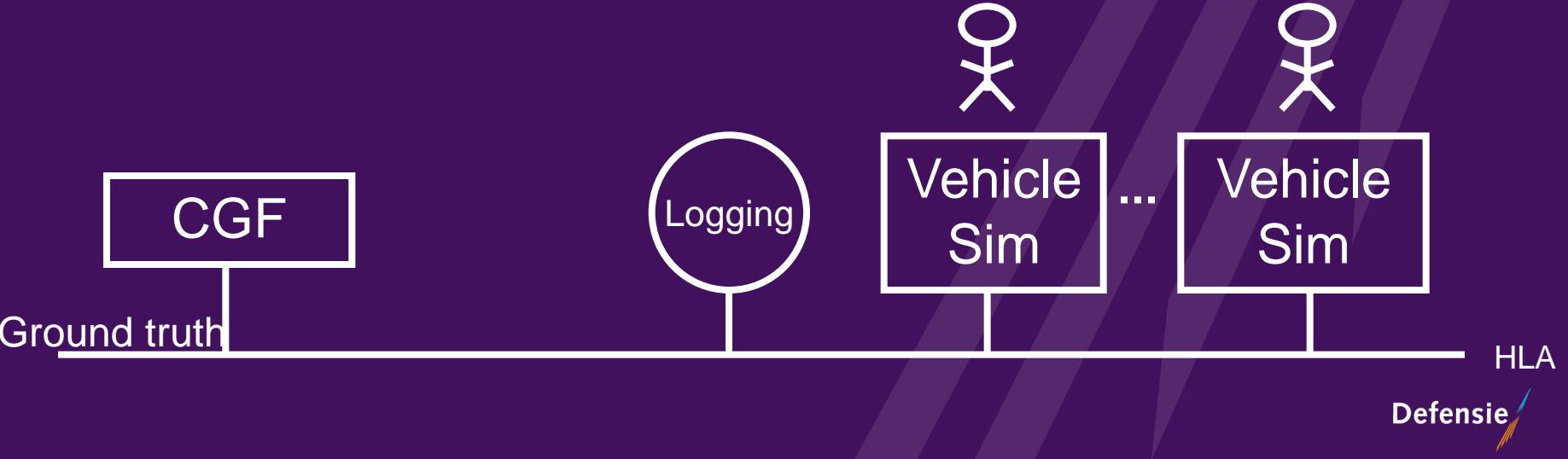
- Positive experience with (COTS) datamapper
- Not all required standards implemented yet
- Use of operational C2 systems can be supported for COP
- Simulation and C2 systems control cannot be supported
- Plans and Orders to Constructive sims cannot be supported

Short Term Recommendations

1. Use a Phased Approach
 - Phase 1 Common Operational Picture
 - Phase 2 Logging and AAR
 - Phase 3 Exchange of orders and plans
 2. Acquisition and use of the WISE COTS datamapper
- Result after phase 1
- An acceptable initial solution for TACTIS
 - An first step to a solution for other systems
 - Short term, does not contradict BML standard under development
3. More experiments with existing systems (C2, CST, TACTIS)
 4. Analyzing user requirements for C2 systems wrt DSS

TACTIS coupling

Current situation



TACTIS coupling

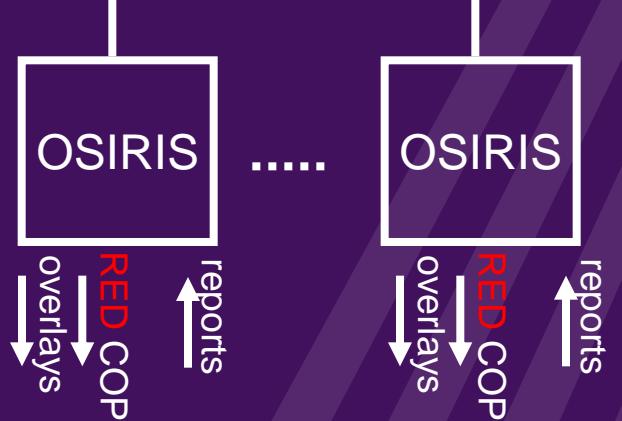
Current situation with C2 added

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Perceived truth



Ground truth



OK

C2FW

HLA

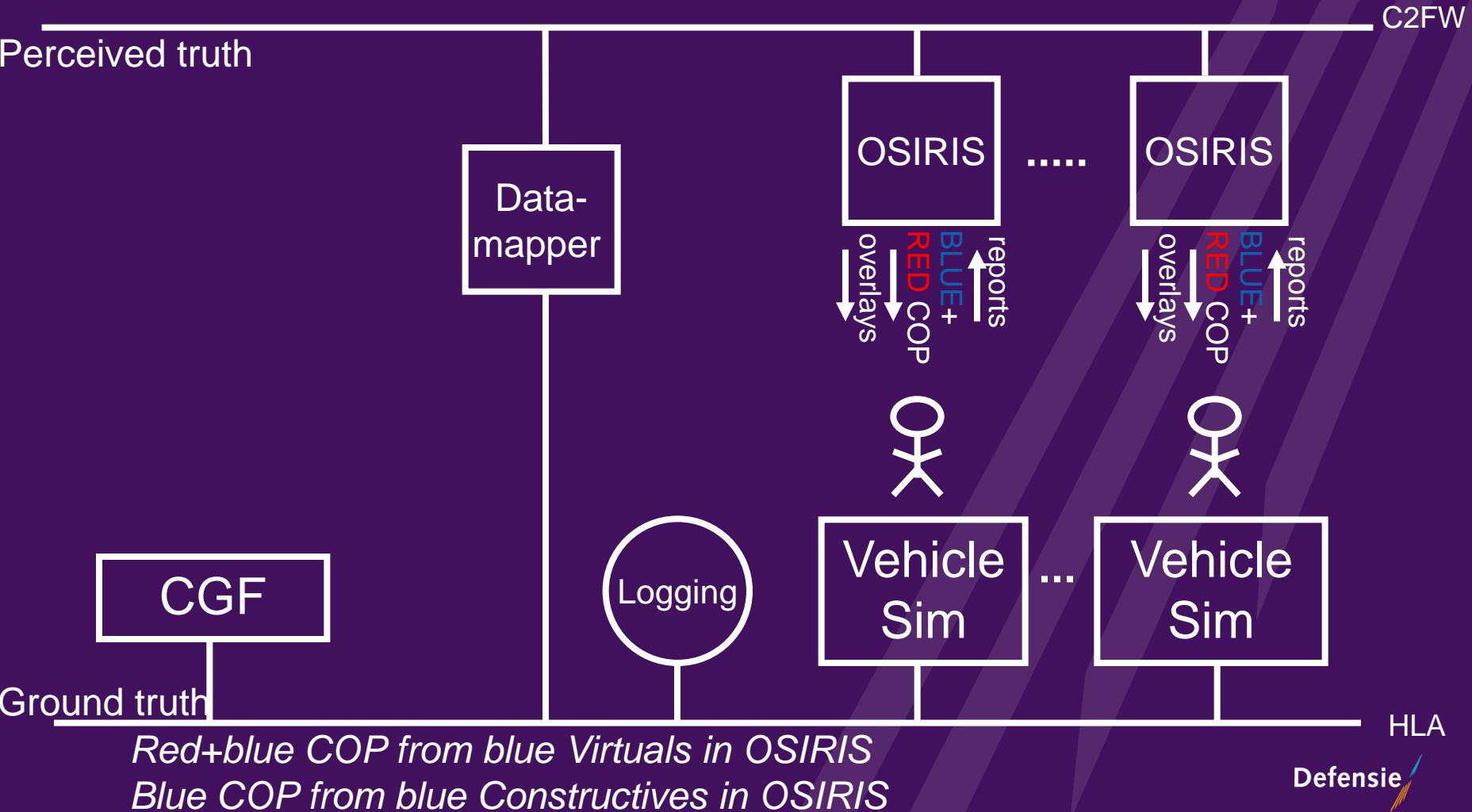
Only Red COP from blue Virtuals in OSIRIS

TACTIS coupling (phase 1)

Possible solution with C2 systems (for virtuals)

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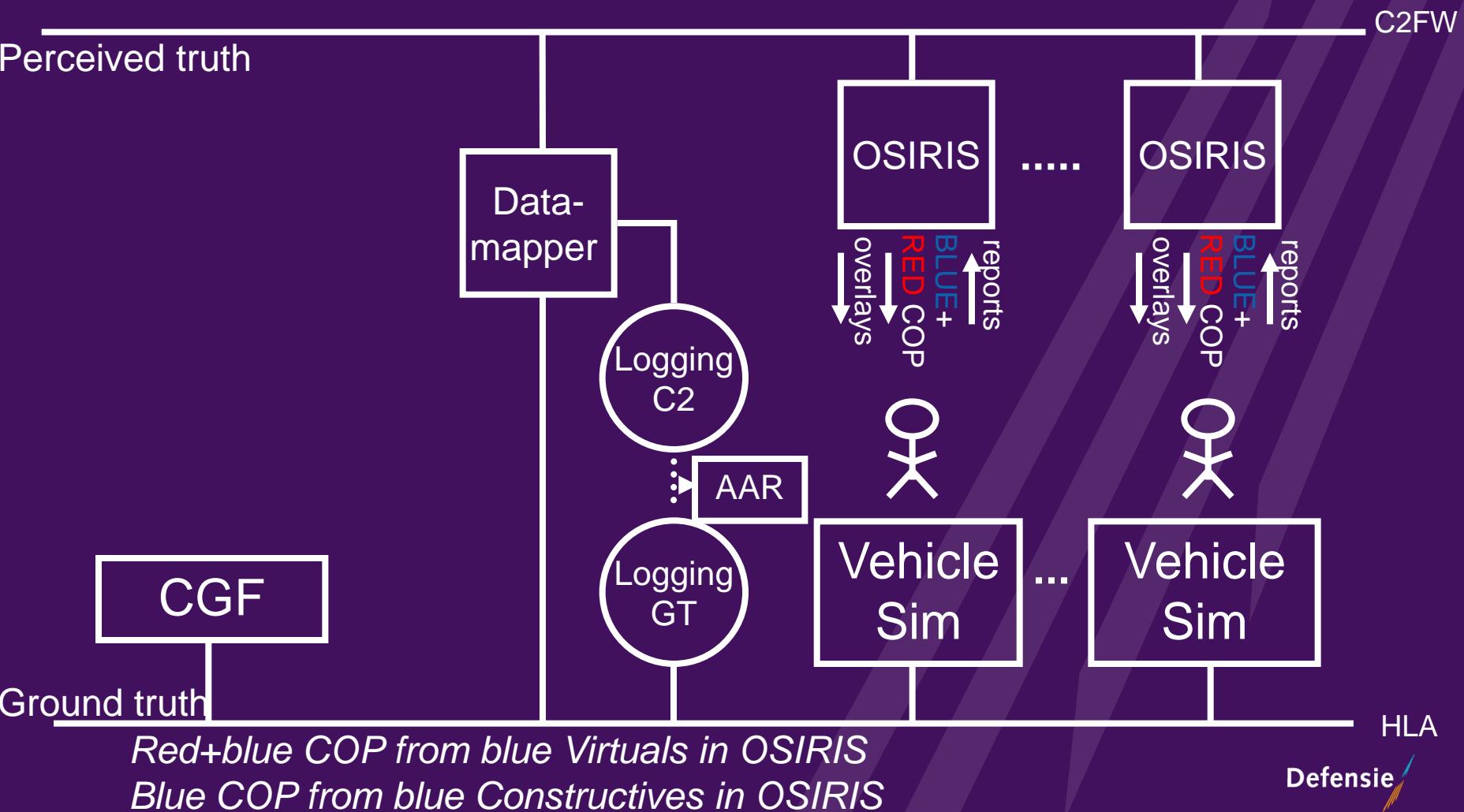
No communications effects simulated in phase 1



TACTIS coupling (phase 2A)

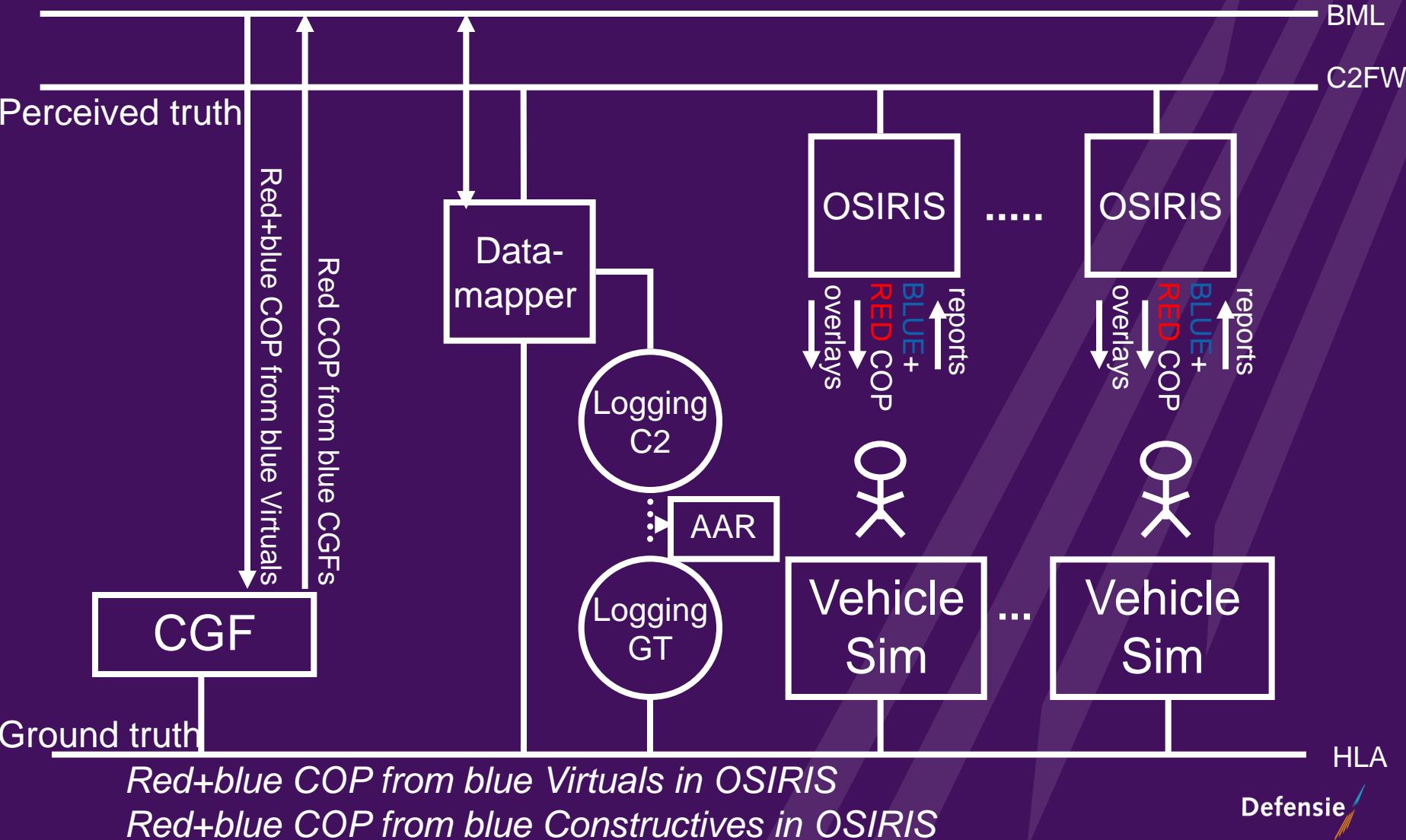
prerequisites for C2/Sim control and AAR

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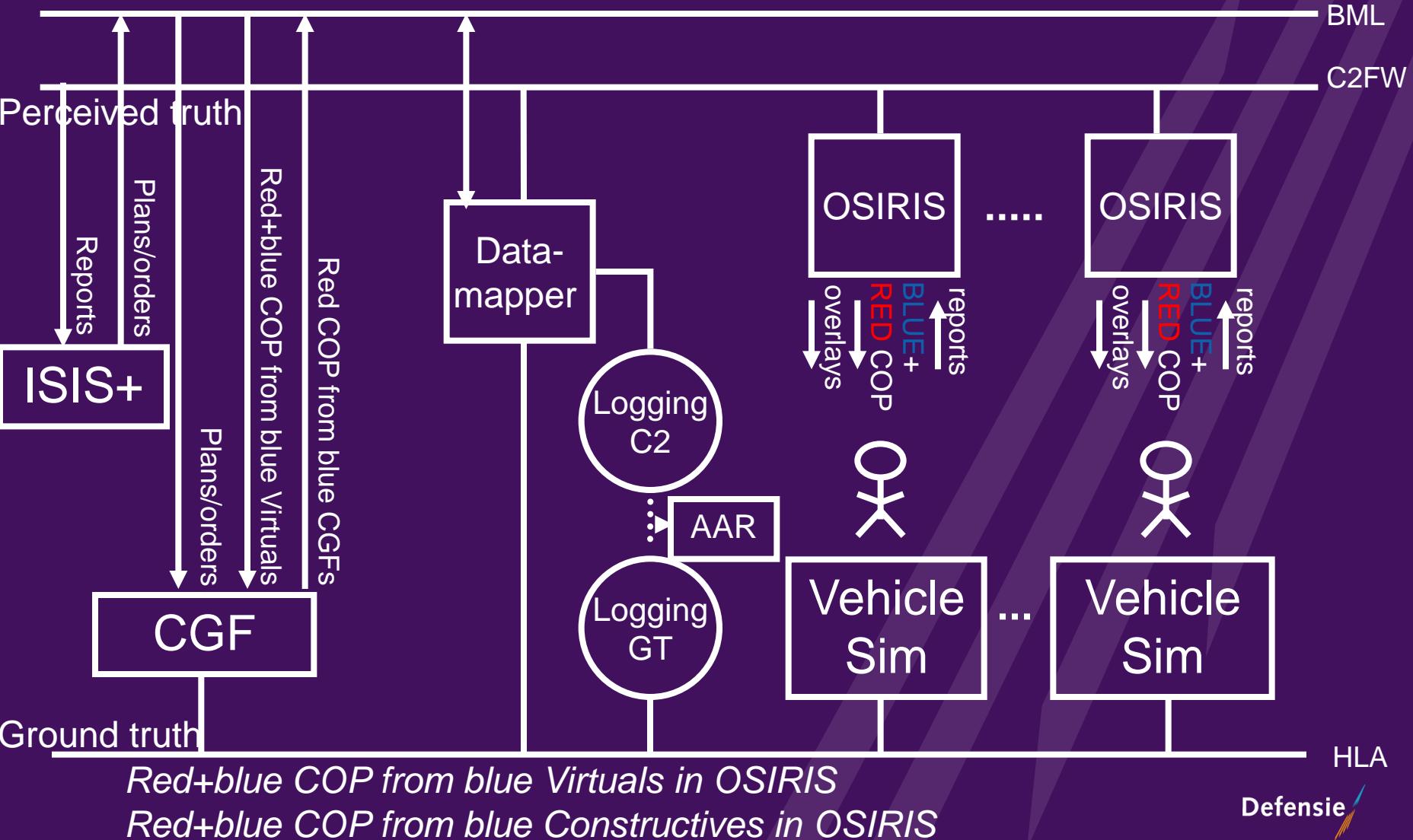
TACTIS coupling (phase 2B)

Red COP from CGFs added



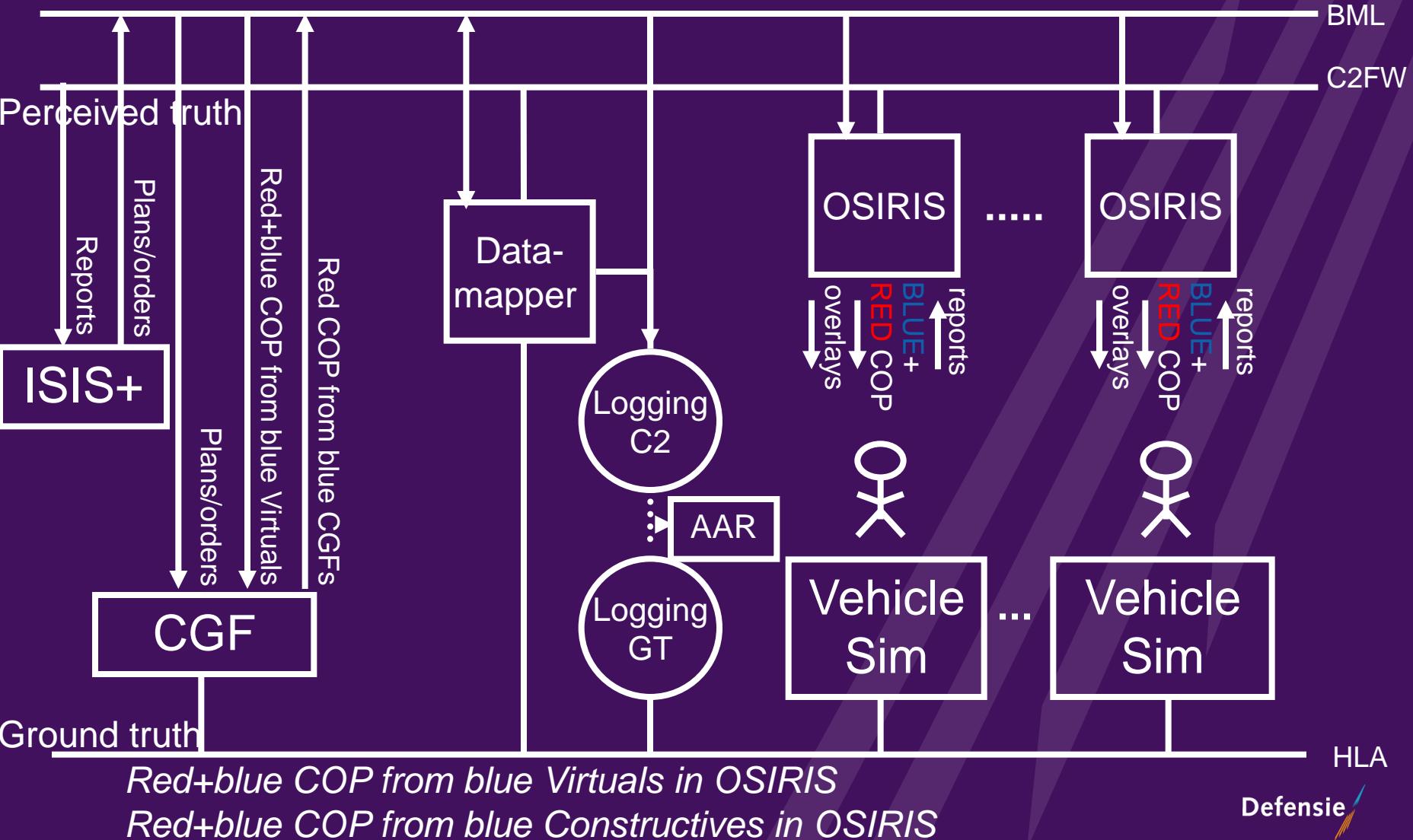
TACTIS coupling (phase 3)

Plans/Orders to Constructives added



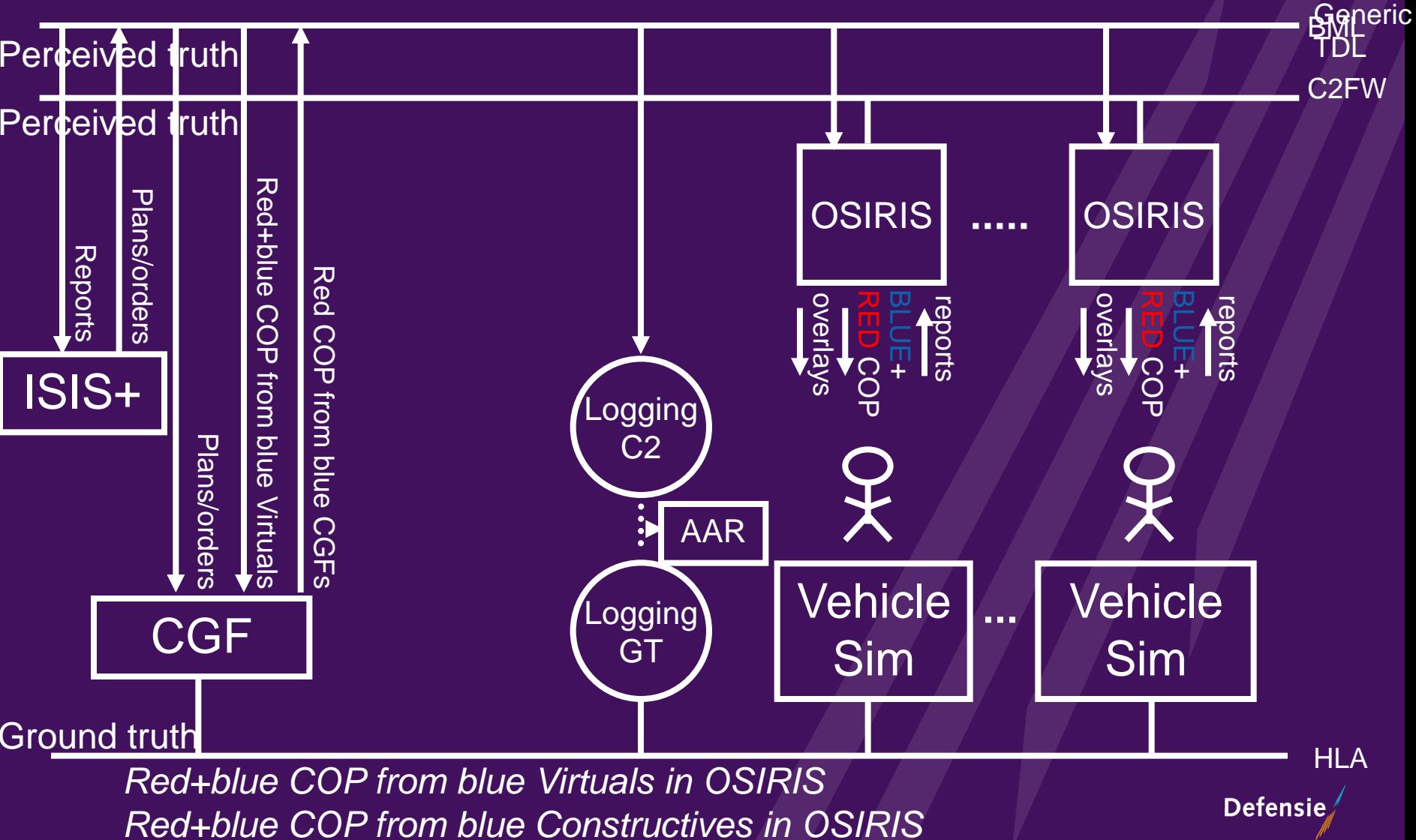
TACTIS coupling (long term)

BML for all tactical data, removal of datamapper



TACTIS coupling (long term)

Integration of BML in tactical datalink



Long Term challenges

In order for C-BML to satisfy Training, Mission Rehearsal and Decision Making requirements the following challenges must be overcome

- Simulation + C2 system control problem must be solved (within or outside BML)
- All C2 and Simulator systems must understand C-BML
- C-BML must not only be human readable but must unambiguously be transformable to an overlay
- BML and existing tactical datalinks (like the NLD MIP based C2FW) must be integrated in the end

End



Questions ??